FIG. 1.

THE REPRODUCTIVE HABITS OF THE NORTH AMERICAN SUNFISHES, FAMILY CENTRARCHIDAE.

FIG. 2.

THE REPRODUCTIVE HABITS OF THE NORTH AMERICAN SUNFISHES, FAMILY CENTRARCHIDAE.

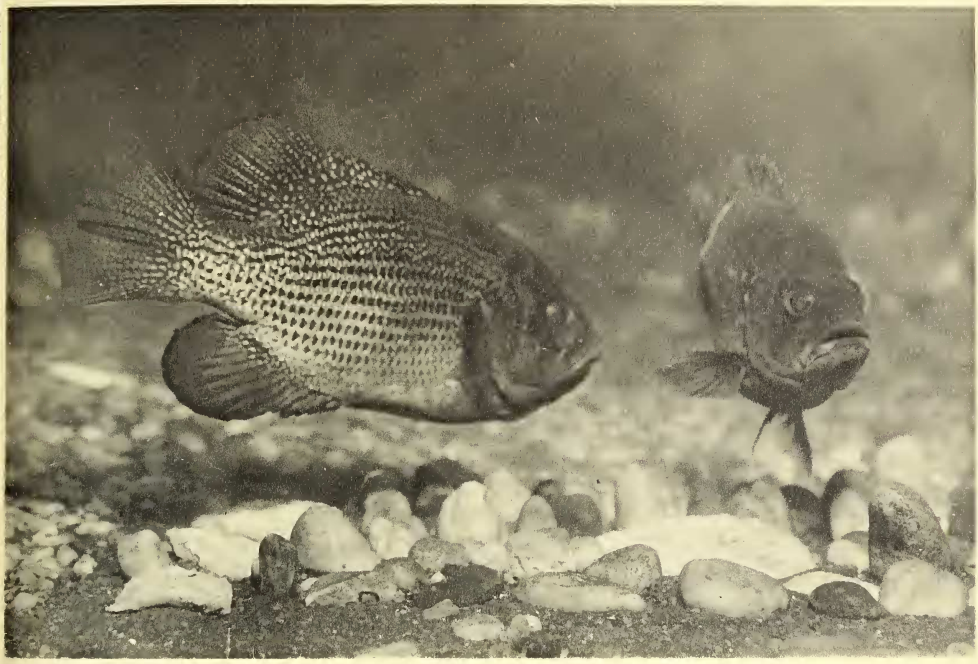

FIG. 3.

FIG. 4.

THE REPRODUCTIVE HABITS OF THE NORTH AMERICAN SUNFISHES, FAMILY CENTRARCHIDAE.

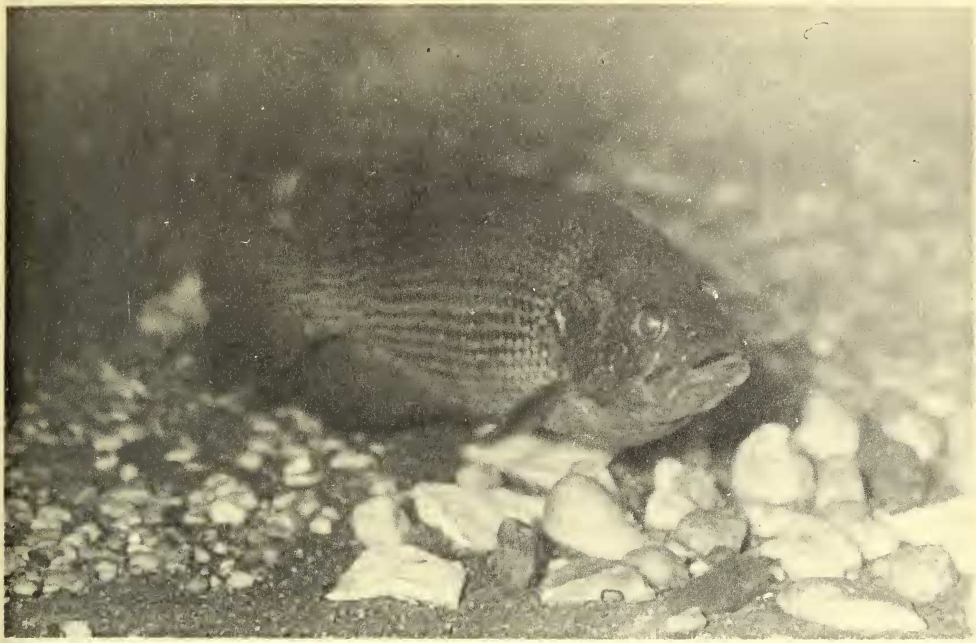

FIG. 5.

FIG. 6.

THE REPRODUCTIVE HABITS OF THE NORTH AMERICAN SUNFISHES, FAMILY CENTRARCHIDAE.

FIG. 7.

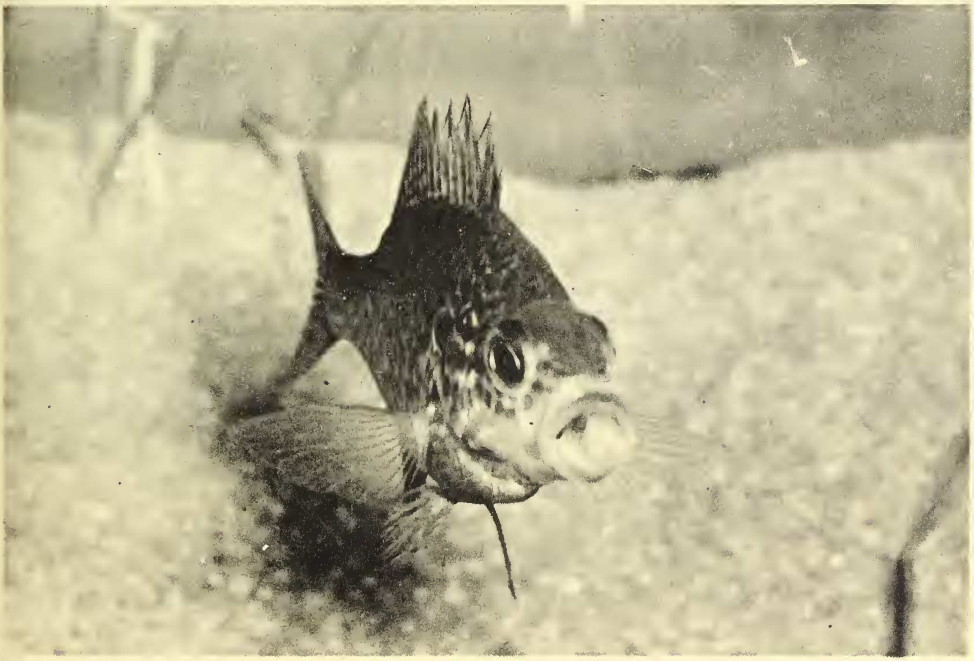

FIG. 8.

THE REPRODUCTIVE HABITS OF THE NORTH AMERICAN SUNFISHES, FAMILY CENTRARCHIDAE.

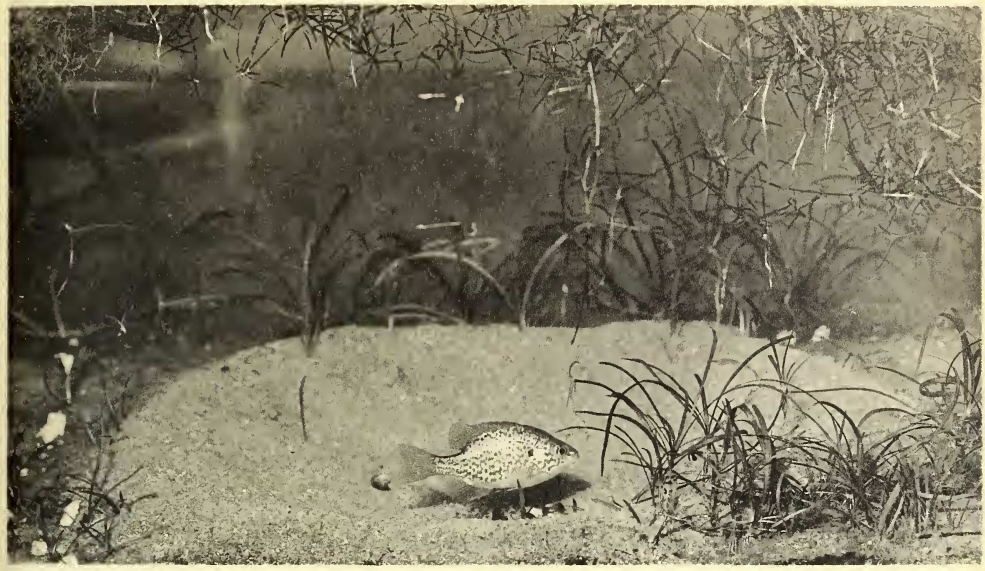

FIG. 9.

FIG. 10.

THE REPRODUCTIVE HABITS OF THE NORTH AMERICAN SUNFISHES, FAMILY CENTRARCHIDAE.

FIG. 11.

FIG. 12.

THE REPRODUCTIVE HABITS OF THE NORTH AMERICAN SUNFISHES, FAMILY CENTRARCHIDAE.

2.

Polychaetous Annelids from the Vicinity of Nonsuch Island, Bermuda[1]. By A. L. Treadwell, Vassar College.

(Plates I-III)

Introduction.

The following is a taxonomic account of some polychaetous annelids collected in the vicinity of Nonsuch Island, Bermuda, in the years 1929-1931, in connection with the work of the Department of Tropical Research of the New York Zoological Society and submitted to me for study by Dr. William Beebe. The greater number of individuals are pelagic species collected during the deep-sea operations but a few are from shallow water and shore localities, some of the latter collected by the writer while a guest at the laboratory in August, 1931. For data relating to the Bermuda locality and to the nets in which the pelagic species were taken, see Zoologica, Vol. XIII, Nos. 1, 2 and 3.

A list of families represented and of new and old species occuring in the collection follows:

Family	Old species	New species
Syllidae	1	..
Amphinomidae	2	..
Polynoidae	2	2
Sigalionidae	..	1
Chrysopetalidae	1	..
Glyceridae	?	?
Aricidae	1	..
Nereidae	3	..
Leodicidae	10	..
Tomopteridae	..	1
Alciopidae	1	..
Phyllodocidae	3	..
Opheliidae	2	..
Typhloscolecidae	..	1
Cirratulidae	..	2
Sabellidae	1	1
	27	8

Two papers dealing solely with the polychaetous annelids of Bermuda have appeared, those of Webster (1884) and Verrill (1900). Webster's was a report on collections made by G. Brown Goode, while Verrill did extensive collecting and study on the islands. Some annelids are described from Bermuda localities in McIntosh's (1885) Report on the annelids of the *Challenger* Expedition and in a paper by Hoagland (1919). Bermuda was grouped with the West Indian region in a monograph by the present writer

[1] Contribution No. 481, Department of Tropical Research, New York Zoological Society.

(Treadwell, 1921) and while the main object of that paper was a study of the Leodicidae, collections made in Bermuda in 1916 demonstrated that in its essential features the annelid fauna of Bermuda is of the West Indian type. This is noticeably the case in the Leodicidae, with the exception that the Atlantic "palolo," *Leodice fucata* Ehlers, which is very abundant farther south, has never been seen in Bermuda. A considerable number of species listed by Ehlers (1887) occur in Bermuda and this monograph should be available to any one studying the annelids of that locality.

Systematic Account.

Family Syllidae.

Typosyllis Langerhans.

Typosyllis corallicola Verrill.

Typosyllis corallicola Verrill, 1900, p. 603.

One specimen collected in tidepool, Nonsuch Island, Aug. 16, 1931 (No. 311,355).

Trypanosyllis Claparède.

Tetraglene phase.

With large numbers of *Polyophthalmus* (see p. 61, Nos. 311, 487 and 311-, 436), there were collected under electric light at the Nonsuch Island boat landing a few individuals that I have identified as the tetraglene phase of an unknown species of *Trypanosyllis*. They average a length of 5 mm. and a width of not more than 0.5 mm. The body is flattened and its most characteristic features are the relatively enormous brown eyes and the brown pigment patches on both dorsal and ventral surfaces near the bases of the parapodia. There are no tentacular cirri or antennae. All cirri are jointed, almost moniliform in character, the dorsal ones longer than the body width, the ventral ones hardly longer than to the ends of the parapodia. The anal cirri are from one-third to one-half as long as the body and very large, each at its base being wider than half the width of the pygidium. Notopodial setae are numerous, slender capillary in form and are longer than the transverse diameter of the body. Neuropodial setae are compound, the terminal joint varying in size, some being hardly longer than their own basal width, others four times as long as this. Behind the apical tooth is a small subapical one.

Family Amphinomidae.

Hermodice Kinberg.

Hermodice carunculata Kinberg.

Hermodice carunculata Kinberg, 1857, p. 14.

Collected in Castle Harbor, April 30, 1930 (No. 30,672) and Nonsuch Island.

Eurythoe Kinberg.

Eurythoe pacifica Kinberg.

Eurythoe pacifica Kinberg, 1857, p. 14.

Collected in tidepool and coral rock, Oct. 22, 1930 (No. 301,360); Sept. 12, 1930 (No. 301,675).

Family Polynoidae.
Polynoe Savigny.
Polynoe granulata Ehlers.

Polynoe granulata Ehlers, 1887, pp. 50-51; Pl. 11, Figs. 2-7.

Collected in coral, Gurnet's Rock, Bermuda, 35 feet deep, Sept. 29, 1930 (No. 301,308); and from reef in Castle Harbor, Aug. 14, 1931 (No. 311,298).

Harmothoe Kinberg.
Harmothoe fragment sp. ?

Collected in Net 928, 500 fathoms, Sept. 20, 1930 (No. 301,128).

Eunoe Malmgren.
Eunoe purpurea n. sp.
(Figs. 1—6).

The body of the type specimen is 18 mm. long, its greatest width 5 mm. and it has 28 somites. The coloration varies somewhat in the different specimens, the characteristic color and the one on which the specific name is based being a purplish brown which is most pronounced on the anterior face of the prostomium, the bases of the palps and the base of the proboscis. In none is the proboscis more than very slightly protruded and it is not clear how much of it shows this coloration. In one specimen, not much colored elsewhere, the ventral surface, except for the mid-line, is dusted with this pigment. In others the anterior and posterior thirds of the dorsal surface are similarly dusted but in all cases the median dorsal third of the body surface is uncolored. In one, the mid-ventral longitudinal line has a pearly lustre and in another this is uncolored but there is on either side a grayish green narrow band.

The width of the prostomium is roughly twice that of its length and all angles are rounded (Fig. 1). The large heavily pigmented eyes occupy the outer four corners of the prostomium, their colorless lenses being projected downward so as not to be visible from the dorsal surface. The peak on either side is extended into a slender cirrus-like process and the anterior margin is deeply incised for the insertion of the cirrophore of the median tentacle, which is short and globular and has the appearance of a goblet supported on a slender stalk. The style of the median tentacle is lost from all specimens. The cirrophores of the lateral tentacles lie ventral to the peaks. Their length is about equal to their width and they extend to about the same distance as the median one. Their styles are short and inconspicuous. The palps are very long and heavy, fully eight times as long as the prostomium. At their bases they are often pigmented, this pigment showing a tendency to arrange itself in fine transverse lines. No dorsal cirri remain and the tentacular cirri are too much mutilated for an accurate description, but they are evidently much longer than the lateral tentacles. The ventral cirri on the first two or three parapodia are very large, extending beyond the seta tips, but in later parapodia they become progressively smaller. In Fig. 1 the one shown at the left is a broken tentacular cirrus and the one on the right is the first ventral cirrus.

The parapodia (Fig. 2, of the 16th), have a large neuropodium and a very small notopodium, each having a large acicula which extends through and beyond the tip of the lobe. In this parapodium (the 16th), the ventral cirrus extends considerably beyond the neuropodial tip. In the notopodium there are a very few heavy setae (Fig. 3), with some much smaller. In the

parapodium figured the numbers were 2 and 3 respectively. The neuropodial setae are of two kinds. The dorsalmost are the more slender and nearly straight and carry two rows of sharp spines (Fig. 4). The ventralmost ones vary in size, the smallest being near the ventral margin and in proportion as they increase in size they acquire a deeper yellowish color. All broaden toward the ends and then taper to a slender and slightly curved apex. Along their broadened regions they carry transverse rows of toothed plates. The heavy dorsal setae also have transverse plates but these are very short and their margins only faintly toothed. (Fig. 5). Note the difference in the scales of magnification between Figs. 3 and 5.

Of the entire collection, only one elytron remains, the 1st or 2nd. It is circular in outline and its surface is densely studded with sharp spines (Fig. 6). These are larger near the middle of the elytron than around the margins.

The type was collected in Net 838, 600 fathoms, Sept. 3, 1930 (No. 30,694), and is in the collections of the Department of Tropical Research of the New York Zoological Society. Other specimens were taken in the following nets: Net 847, 500 fathoms, Sept. 4, 1930; Net 868, 900 fathoms, Sept. 10, 1930, (No. 30,838); Net 902, 700 fathoms, Sept. 17, 1930 (No. 301,018); Net 942, 1,000 fathoms, Sept. 24, 1930 (No. 301,193); Net 1,000, 700 fathoms, June 5, 1931 (No. 31,126); and Net 1,004, 600 fathoms, June 6, 1931 (No. 31,155).

Drieschia Michaelsen.

Drieschia atlantica n.sp.

(Figs. 7-9).

There are three specimens in the collection, all more or less mutilated. The type which is broken near the centre but evidently retains all of its somites, is 12 mm. long and its greatest diameter, just back of the head, is 1 mm. The prostomium (Fig. 7) has rounded posterior angles and its lateral margins are only slightly incurved to meet the cirrophores of the lateral tentacles. These latter are not sharply separated from the prostomium and are about one-quarter as long as it. There is no marked anterior incision for the attachment of the cirrophore of the median tentacle, which in the type is not sharply separated from the lateral ones. In other specimens the distinction is sharper. The median cirrophore is about twice as thick as the lateral and a trifle longer. The eyes are small but prominent, the anterior pair lying near the lateral margins at about the middle of the prostomium while the posterior pair are near the posterior margin and are closer together than the anterior.

The style of the lateral tentacle is about twice as long as the cirrophore, slender and sharp pointed, and that of the median tentacle is more than four times as long as the lateral and very slender in relation to its length. The palps are also slender. In the type they extend to a distance considerably beyond the tentacle tip but in another specimen (probably injured), they are much shorter. The tentacular cirri are also slender and as long as the palps.

The parapodia are uniramous, the notopodium being absent (Fig. 8). The neuropodium is cylindrical and sharp pointed, having a single acicula and a small ventral cirrus not reaching the apex of the parapodium. In all cases the cirrophore of the dorsal cirrus is inflated to form a hollow structure which in some anterior somites may be larger than the parapodium and completely obscure it from a dorsal view. The cirrophores are largest in the 5th and 7th parapodia and decrease in size posteriorly, though their size relative to the parapodium is not so much less in this region. Too many of the styles have been lost to determine the point with

accuracy but it seems as if, posterior to the 7th parapodium, the styles are alternately long and short. They are all very slender. There are 2 slender anal cirri.

Just dorsal to the apex of the parapodium is a tuft of two or three long and slender setae and ventral to it a few much larger ones. These latter (Fig. 9) broaden slightly toward the end and then narrow to a blunt point, this terminal portion being very slightly spoon-shaped and carrying a series of small toothed plates along the concave surface.

The type has 14 pairs of elytrophores but all of its elytra are lost. One other specimen retains the most anterior and most posterior one on one side. Apparently in life they cover the entire dorsal surface of the body. Descriptions of elytra from other species of this genus speak of them as "inflated," this together with the inflated character of the dorsal cirrophores being correlated with their pelagic mode of life. Neither of the two above mentioned elytra showed any sign of inflation but they very probably were so when alive, for they look very much as a very thin-walled disk-shaped sac might look if it were collapsed and its wall thrown into wrinkles. The outline is nearly circular, the margin smooth and the surface covered with numerous wrinkles running in all directions.

The type was taken in Net 953, 1,000 fathoms, Sept. 26, 1930 (No. 301,259) and is in the collections of the Department of Tropical Research of the New York Zoological Society. The others were taken in Net 841, 500 fathoms, Sept. 4, 1930 (No. 30,719) and Net 939, 1,000 fathoms, Sept. 24, 1930 (No. 301,176).

Family Sigalionidae.
Eupholoë McIntosh.
Eupholoë nuda n. sp.
(Figs. 10-14).

A single specimen 30 mm. long and 3 mm. wide. The prostomium (Fig. 10) is hemispherical in outline but is truncated on its anterior margin for the insertion of the single tentacle. The tentacle is small, its apex not reaching to the ends of the underlying setae. There is a pair of small eyes on the dorsal peristomial surface and a much larger pair on the ventral, not visible from the dorsum. There are no tentacular cirri on the specimen. In Fig. 10 the prostomium is drawn as if the anterior dorsal margin of the 3d somite, which when in place completely covers it, were drawn back. The cirri figured at the sides are the dorsal cirri of the 3d somite. The first two parapodia with their setae crowd together under the prostomium and are in contact on the ventral line, lying between the prostomium and the palps. The 2d parapodia extend forward of the prostomium and as stated above, the 3d somite extends over the prostomium. The palps are slender and extend only to a short distance beyond the ends of the first setae. The first ventral cirrus is large, the next one smaller and throughout most of the body they are very small.

In this genus the elytra should form an overlapping series along both margins of the body, leaving the greater part of the surface uncovered. In *E. nuda* no elytra are present, although oval or round areas looking like the scars left when elytra are torn off occur in the appropriate somites. The most reasonable conclusion would be that elytra were lost, but careful examination of these structures fails to reveal any trace of torn or ragged edges such as should appear if this had been the case. The dorsal body surface is sprinkled with fine sand grains which extend down to the parapodia and show no trace of disturbance in the places where elytra should have been. It seems certain that the specimen is normally lacking in elytra. These sand grains are quite uniformly scattered over the dorsal

surface, being generally a trifle larger in the mid-line than elsewhere but otherwise show no differences in different body regions. The ventral surface is thickly studded with short rounded papillae (Fig. 11) which give it a "shagreen" appearance. On the dorsal surface of each parapodium, and lying just under the above mentioned elytral "scar" is a single "branchia" in the form of a blunt papilla whose length only slightly exceeds its breadth.

The parapodia (Fig. 11) have large neuro- and very much smaller notopodia, the former truncated at the apex, giving it a triangular outline. The notopodium is much smaller, looking like a mere outgrowth from the neuropodium. It carries on its upper surface a small knob-like protuberance. Each lobe has a single acicula. The ventral cirrus is small and does not reach the end of the neuropodium. On the ventral and lateral surface of the parapodia are numerous papillae.

The notopodial setae form a dense bunch radiating from a common center on the dorsal face of the notopodium. They are slender and sharp pointed and each carries two rows of toothed plates (Fig. 12). Two kinds of setae occur in the neuropodium. The more dorsally placed ones are very large and heavy, the terminal joint relatively rather short, and are without any subterminal tooth (Fig. 13). Ventral to these is a tuft of more slender setae in which the terminal joint is relatively longer and more slender and has a single very slender subterminal tooth (Fig. 14). The relative sizes of these two kinds of setae are shown in Figures 13 and 14, which are drawn to the same scale.

The genus *Eupholoë* was established by McIntosh (1885, p. 157), for *E. philippinensis,* on a single specimen dredged off Mindanao in the Philippines (1885, pp. 157-159, Pl. 22, Figs. 6, 7; Pl. 24, Fig. 7; Pl. 25, Fig. 10; Pl. 13A, Figs. 16, 17). The diagnosis is as follows: "Body elongated, somewhat truncated in front and tapering posteriorly, the former end being covered with coarse and the latter with fine, sand grains. Elytra small, confined to the lateral regions and furnished with peculiar processes which like the other parts of the scales are covered with long cilia. A rudimentary branchia (?) on each foot. Dorsal bristles slender with long spinous rows, ventral with single short terminal processes beneath the hook of which is a minute spine." In the detailed description and figures of *E. philippinensis* the prostomium has exactly the structure of *E. nuda,* but tentacular cirri are absent from the latter (presumably by accident) and the two first parapodia do not crowd together under the prostomium in *E. philippinensis* as they do in *E. nuda.* A minor difference is that in *E. nuda* the sand grains on the dorsal body surface are of uniform size throughout. Whether the elytra in the latter species are really absent must be determined when other material is available for study. McIntosh's Fig. 16, Pl. 13A, is exactly like Fig. 12, while his Fig. 17 is essentially like Fig. 13 except that he represents a very small subterminal tooth. In his drawing this looks more like an accidental irregularity than a tooth, and it may be that the two are alike in structure. He does not figure the more slender ones like Fig. 14.

The type is in the collections of the Department of Tropical Research of the New York Zoological Society and was collected in coral at Gurnet's Rock, Bermuda, 35 feet deep, Sept. 29, 1930 (No. 301,308).

Family Chrysopetalidae.

Bhawania Schmarda.

Bhawania goodei Webster.

Bhawania goodei Webster, 1884, pp. 308, 309; Pl. 7, Figs. 10-15.

Collected from reef in Castle Harbor, Aug. 16, 1931 (No. 311,350) and from coral at Gurnet's Rock, 35 feet deep, Aug. 19, 1931 (No. 311,483).

Family Glyceridae.
Glycera Savigny.

Two very young specimens of this genus, too immature for identification, collected in Net 824, 800 fathoms, Sept. 1, 1930 (No. 30,672).

Family Aricidae.
Nainereis Blainville.
Nainereis setosa Verrill.

Aricia setosa Verrill, 1900, pp. 651-653.

Two specimens, collected on mud flat, St. David's Island, Bermuda, Aug. 17, 1931 (No. 311,397).

Family Nereidae.
Nereis Linnaeus.
Nereis bairdii Webster.

Nereis bairdii Webster, 1884, pp. 312-313; Pl. 8, Figs. 22-28.

Collected at Gurnet's Rock, 35 feet deep, Aug. 19, 1931 (No. 311,481); tidepools, Nonsuch Island, Aug. 16, 1931 (No. 311,357); and mud flats, St. David's Island, Aug. 17, 1931 (No. 311,396). These were all in crevices in coral rocks from shallow water.

Heteronereis phase.
(Figs. 15, 16).

Specimens collected in Net 817, 600 fathoms, Aug. 29, 1930 (No. 30,630); and Net 834, 400 fathoms, Sept. 3, 1930 (No. 30,680) were identified as *N. bairdii* from their jaw structure (Webster's Figs. 22a and 23). The prostomium carries very large eyes, those of the same side in contact with one another and their lenses small. The peristomium is swollen so as to be as wide as the 1st somite (compare Webster's Fig. 22 for the atokous phase). In one of the two specimens there are 14, in the other 18, somites in the anterior region. This anterior region is widest at about the 6th somite and from here narrows in either direction. The tentacles and palps are little changed from the atokous condition but appear larger because of the swollen prostomium. Neither specimen is entire, one retaining some thirty somites in the posterior region, the other fewer. The tentacular cirri retain the relative length of the atokous phase but their bases are heavier and in the preserved material have a general "ram's horn" effect. In the anterior region dark brown pigment patches lie on the body wall just dorsal to the parapodia, the usual arrangement being one nearer the anterior and one nearer the posterior border of the somite. These patches are much darker in one specimen than in the other.

The anterior parapodia are not noticeably different from those of the atokous phase except that the dorsal cirrus acquires a broader base and becomes lanceolate in outline. The setae show no change (see Webster's Figs. 26 and 27). The structure of the parapodia of the modified region can best be understood by reference to Fig. 15, taken from the smaller of the two specimens. Neither of the two contains sex products and from the smooth character of the dorsal cirrus I assumed that this is a female. The other specimen, however, is larger and in this, while the character of the general modification is the same, the dorsal cirrus shows the lobings characteristic of the male. It seems certain therefore that both are males but that one has not yet fully reached the epitokous condition. The setae

are numerous, extend considerably beyond the parapodium lobes and have the characteristic broad terminal joints.

Nereis glandulata Hoagland.

Nereis glandulata Hoagland, 1919, p. 575; Pl. 30, Figs. 1-6.

Heteronereis phase. (Fig. 17). Identified by a comparison of the jaws with Hoagland's Figs. 2 and 3. This species also has very rounded parapodial lobes and a pigment patch on the parapodium (Hoagland's Fig. 4), which characters are retained in the anterior somites of the epitokous phase. The prostomium, except for increase in the size of the eyes, is not much changed from the atokous condition. The 1st somite is about equal to the prostomium in width and from there there is a gradual increase in width to the 6th somite. In this anterior region the only change is in the character of the dorsal cirrus, which is larger in all somites and in the middle of the region has the avicular character shown in Fig. 16. The setae are unmodified (compare Hoagland's Figs. 5 and 6). In the posterior, modified region the parapodia are as in Fig. 17. Since the dorsal cirrus is lobulated I have assumed that both are males. The setae are numerous, long and have the usual heteronereid form.

Collected in Net 767, 800 fathoms, July 3, 1930 (No. 30,382); and Net 775, 1,000 fathoms, July 4, 1930 (No. 30,396).

Nereis mirabilis Kinberg.

Nereis mirabilis Kinberg, 1865, p. 170.

Nereis gracilis Webster, 1884, pp. 313, 314; Pl. 9, Figs. 29-35.

Name preoccupied. See Kinberg *loc. cit.*, p. 170.

Collected at Gurnet's Rock, Bermuda, in coral, 35 feet deep, Sept. 29, 1930 (No. 301,308); Castle Harbor, reef, Aug. 15, 1931 (No. 311,334); and tidepools, Nonsuch Island, Aug. 16, 1931 (No. 311,357). Found in association with *N. bairdii* in decomposing coral rock.

A number of small heteronereids collected Aug. 18, 1931, swimming at the surface under a light, are evidently *N. mirabilis*, because they show the very unusual character of the prostomium of this species which is little changed in the heteronereid. The first dorsal cirri are somewhat expanded but the others show no modifications. The parapodia of the modified region have the usual fin-like lobes.

Family Leodicidae.

Leodice Savigny.

Leodice mutilata Webster.

Eunice mutilata Webster, 1884, pp. 315-316; Pl. 9, Figs. 36-40.

Leodice mutilata Treadwell, 1921, pp. 30-33; Pl. 3, Figs. 5-8; Text-figs. 66-76.

In the collections sent me, this was recorded only from Gurnet's Rock, 35 feet deep, Sept. 29, 1930. It was abundant, however, in the collections I studied on Nonsuch Island, and is the commonest *Leodice* of the region, occurring in dead coral rock. From the twisted position it assumes among the rock crevices, it is difficult to extract without breaking, a peculiarity which probably accounted for Webster's specific name.

Leodice culebra Treadwell.

Leodice culebra Treadwell, 1921, pp. 49-51; Pl. 2, Figs. 13-16; Text-figs. 144-153.
Collected in tidepools, Nonsuch Island, Aug. 16, 1931.

Leodice longicirrata Webster.

Eunice longicirrata Webster, 1884, pp. 318, 319; Pl. 12, Figs. 75-80.
Leodice longicirrata Treadwell, 1921, p. 11-15; Pl. 1, Figs. 1-4; Text-figs. 3-12.
Collected at Gurnet's Rock, 35 feet deep, Sept. 29, 1931 (No. 301,308)

Leodice denticulata Webster.

Eunice denticulata Webster, 1884, pp. 316-317; Pl. 10, Figs. 41-45.
Leodice denticulata Treadwell, 1921, pp. 22-25; Pl. 3, Figs. 1-4; Text-figs. 41-53.
Collected at Gurnet's Rock, 35 feet deep, Aug. 19, 1931 (No. 311,482).

Nicidion Kinberg.
Nicidion kinbergii Webster.

Nicidion kinbergii Webster, 1884, pp. 320, 321; Pl. 12, Figs. 81-88.
Treadwell, 1921, pp. 91-93; Pl. 6, Figs. 6-8; Text-figs. 324-332.

One specimen, locality uncertain. It is generally found in the harder portions of the dead coral rock near low water mark.

Marphysa Quatrefages.
Marphysa regalis Verrill.

Marphysa regalis Verrill, 1900, pp. 636, 637.
Marphysa fragilis Treadwell, 1911, pp. 2-5; Figs. 1-7.
Marphysa regalis Treadwell, 1921, pp. 66-69; pl. 5, Figs. 9-12; Text-figs. 224-234.

Collected at Gurnet's Rock, 35 feet deep, Sept 29, 1930 (No. 301,308); tidepools, Nonsuch Island, Sept. 12, 1930 (No. 301,675). It is very common in the soft beach rock.

Marphysa acicularum Webster.

Marphysa acicularum Webster, 1884, pp. 319-320; Pl. 10, Figs. 50-53.
Treadwell, 1921, pp. 57-59; Pl. 5, Figs. 1-4; Text-figs. 184-193.

Collected on St. David's Island, Aug. 17, 1931 (No. 311,399). It is common in muddy flats between tide levels.

Paramarphysa Ehlers.
Paramarphysa obtusa Verrill.

Paramarphysa obtusa Verrill, 1900, pp. 646, 647.
Treadwell, 1921, pp. 76, 77; Text-figs. 269-278.

Collected in coral, Gurnet's Rock, 35 feet deep, Sept. 29, 1930 (No. 301,308).

Dorvillea Parfitt.

In most of the literature this genus is given as *Staurocephalus*. Verrill (1900, pp. 647, 648) gave reasons for changing it to *Stauronereis*. Chamberlin (1919, p. 339), applying the laws of priority, showed that it should be *Dorvillea*.

Dorvillea melanops Verrill.

Stauronereis melanops Verrill, 1900, pp. 647, 647.
Treadwell, 1921, pp. 125-127; Text-figs. 459-467.

A single small specimen was collected with numerous individuals of *Polyophthalmus* (see p. 61) under electric light at the boat landing on Nonsuch Island (No. 311,436) on the evening of Aug. 18, 1931. When adult, it is not a pelagic species.

Dorvillea erythrops Verrill.

Stauronereis erythrops Verrill, 1900, pp. 649, 650.

One specimen, taken under electric light, Nonsuch boat landing, Aug. 19, 1931 (No. 311,485).

Family Tomopteridae.
Tomopteris Eschscholtz.
Tomopteris longisetis n. sp.
(Figs. 18-21).

Noticeably different from previously described species in that the second cirrus with its seta is considerably longer than the body. The following measurements were taken from four of the best preserved specimens.

Total body length	Length of Second cirrus	No. of parapodia
55 mm.	65 mm.	38.
23 mm.	31 mm.	25.
22 mm.	27 mm.	?
55 mm.	90 mm.	38.

The parapodial number given refers only to the well defined body somites and does not include the rudimentary ones of the "tail." In the third of the above measurements the number was uncertain owing to imperfect preservation. As has before been recorded in this genus, the somite number varies with the total length.

In general body appearance *T. longisetis* differs from the usual in that the body is broader in proportion to its length and the separation between body and parapodia is much less distinct. The parapodia are short and thick and are in contact at their bases, giving the whole body a much more compact appearance than is usual. In other species the parapodia may be as long as the body width; in this they are shorter.

In preserved material the body is opaque and in some has a pearly white appearance, while others are brownish in tint. The tentacles (Fig. 18), are slender and extend to the 2nd parapodium. The 1st cirrus is absent. The 2d cirrus has a triangular base whose apex extends about as far as to the end of the tentacle. Seen from the ventral surface the cerebral ganglion with commissures and ventral cord are prominent features, being lighter in color and more opaque than the remainder of the body. Anterior to the cerebral ganglion and visible on the ventral surface is a pair of small eyes which look as if they are borne on narrow lobes

extending anteriorly from the cerebral ganglion. From the 1st to the 4th parapodium there is a regular increase in length, the 4th being about twice as long as the 1st. From the 4th backward there is a very slight increase in length as far as the anterior third of the body and behind this a gradual decrease to the narrow posterior end, the parapodia in all cases having a definite size relation to that of the somite to which they are attached. Their form is much the same throughout the body except for the "tail" where they are cylindrical structures with a mere hint of a bifid apex.

The parapodia (Fig. 19) have short thick bases and bifid ends, the end portions equal in size and each carry a much fluted fin extending all around the terminal margin. The glandular structures are confusing in this material. In the larger specimens where this fluting is most noticeable, no trace of glands could be seen. In the smaller specimens the ventral lobe of the parapodium carries a large gland-like structure, the row of these when seen under low magnification looking like a series of suckers (Fig. 20). These have no color. In the smallest specimens each apical branch of the parapodium has on its outer margin a rosette gland with a dark sepia color (Fig. 21). In some cases the rosette glands are not pigmented. In the unusual length of the second cirrus, *T. longisetis* agrees with *T. nisseni* Rosa, as described by Southern (1910, p. 17, Pl. 1, Figs. 1 and 2), but is fundamentally different in that *T. nisseni* has fewer parapodia.

Specimens were taken in 18 deep sea nets, drawn from 500 to 1,000 fathoms, during May 17-28, 1929, Sept. 1-24, 1930, and July 25 to Aug 18, 1931 (Nos. 29,475; 29,476; 3,050; 30,116; 30,537; 30,623; 30,757; 301,122; 301,124; 301,125; 301,129; 301,155; 301,675; 31,840; 311,078; 311,103; 311,164; 311,432).

Tomopteris sp?

A single specimen 35 mm. long, with tail 15 mm. in length, thus the tail relatively longer than in *T. longisetis*. The parapodia are much more distinct from the body than is the case in the latter species, are longer and more slender and are without marginal frill. There is a single very large opaque rosette gland on each ventral branch. On one side of the ventral region is what seems to be a 1st cirrus and eyes are present, but the whole is too much macerated for accurate description. The 2nd cirrus is not more than one-half as long as the body. Because of gradual modification of the parapodia until they seem to fade away into the general body surface, it is not easy to determine their number in the tail region but there are at least twenty. Taken in Net 792, 600 fathoms, July 9, 1930 (No. 30,486).

Family Alciopidae.

Vanadis Claparède.

Vanadis fusca-punctata Treadwell.

Vanadis fusca-punctata Treadwell, 1906, pp. 1159, 1160; Figs. 29-31.

The species was described from specimens collected in the Hawaiian Islands. Others were taken at the Galápagos Islands by the *Arcturus* Expedition (Treadwell 1928, p. 462) and it is the most abundant species in the Bermuda collections. It can easily be recognized by the form of the head region and the rows of dark spots on the body.

Collected in 52 deep sea nets from 0 to 1,000 fathoms during the following dates: May 20 to June 17, 1930; Aug. 28 to Sept. 25, 1930, and June 3 to Aug. 14, 1931. (Nos. 29,471; 3,069; 30,121; 30,229; 30,234; 30,531; 30,576; 30,591; 30,608; 30,637; 30,640b; 30,656; 30,660; 30,661; 30,788; 30,846; 30,875; 30,915; 301,101; 301,135; 301,180; 301,226; 3,183; 31,245; 31,312; 31,315; 31,338; 31,347; 31,365; 31,390; 31,391; 31,392; 31,436;

31,437; 31,438; 31,472; 31,496; 31,589; 31,594; 31,610; 31,630; 31,635; 31,661; 31,681; 31,706; 31,712; 31,756; 31,866; 31,927; 311,131; 311,184; 311,207; 311,254).

Fragments, probably of this species but too much injured for accurate identification, were collected in 11 other nets towed at depths from 25 to 1,000 fathoms during June, 1930, and June 15 to Aug. 11, 1931 (Nos. 30,142; 30,841; 30,987; 30,990; 301,199; 31,217; 31,456; 31,681; 31,749; 31,758; 311,174).

Family Phyllodocidae.

Phyllodoce Savigny.

Phyllodoce oculata Ehlers.

Phyllodoce oculata Ehlers, 1887, pp. 135-140; Pl. 40, Figs. 4-6.

Collected in coral, Gurnet's Rock, 35 feet deep, Sept. 29, 1930 (No. 301,308) and August 19, 1931 (No. 311,484); Castle Harbor, Aug. 15, 1931 (Nos. 311,333; 311,336).

Lopadorhynchus Grube

Lopadorhynchus nans Chamberlin.

Lopadorrhynchus nans Chamberlin, 1919, pp. 116-119; Pl. 17, Figs 1-5.

Two well marked varieties of this species are in the collection. Most are slender, not more than 10 mm. in length, pearly white in alcohol and must have been translucent when alive. The others are generally much longer and have thick, opaque, yellowish brown bodies. Both agree with Chamberlin's description of the form of the head and anterior somites. Chamberlin's single specimen was taken between Easter Island and Peru in 17° 55′ S. Lat. and 87° 42′ W. Long. The Bermuda specimens were taken in 10 deep-sea nets, ranging from 50 to 1,000 fathoms, during September, 1930, and from July 6 to Aug. 19, 1931. (Nos. 30,863; 301,138; 301,181; 31,453; 31,470; 31,494; 31,609; 31,633; 31,999; 311,476).

Lopadorhynchus uncinatus Fauvel.

Lopadorhynchus uncinatus Fauvel, 1916, pp. 57-61; Pl. 1, Figs. 2, 3; Pl. 4, Figs. 1-4.

Easily recognized by the excessive development of the first two parapodia. Fauvel in his diagnosis of the species says that the eyes are black, but in the later description he describes them as having a more or less circular margin of brown. In this respect and in the distribution of the chromatophores over the body surface the Bermuda specimens agree with Fauvel's, which were collected in the vicinity of Monaco. The Bermuda specimens were taken in the following nets: Net 945, 500 fathoms, Sept. 25, 1930 (No. 301,213), Net 947, 700 fathoms, Sept. 25, 1930 (No. 301,224) and Net 967, 500 fathoms, Sept. 30, 1930 (Nos. 301,314).

Family Opheliidae.

Ammotrypane Rathke.

Ammotrypane bermudiensis n. sp.

(Figs. 24-26).

The body is rounded dorso-laterally and flattened ventrally with a deep longitudinal groove along the ventral surface. Since intersegmental constrictions do not appear, the number of somites can only be estimated by the seta tufts of which there are 32 pairs, situated ventro-laterally. The type

is 32 mm. long, its greatest width 2.5 mm. From apex of prostomium to the first seta tuft is 1.5 mm. The anal tube is 3 mm. long. At the posterior end the somites (as indicated by the seta tufts), are very closely crowded together. The prostomium is conical (Fig. 24), its basal diameter being equal to one-half of its length and it carries a small mucron on the apex. From the base of the prostomium there is a slight increase in width to the middle of the body and from there a decrease posteriorly. At its base the anal tube has the same width as the last somite, but it narrows to an apex about one-half as wide. It is cylindrical in form with transverse markings in some cases clearly marked, in others more obscure. The anal opening is dorso-terminal and is bounded laterally by two thin plates whose free edges in some cases show simple scalloping, in others carry about six short papillae (Fig. 25). What seems to be the normal condition of the anal cirri is that there is one pair of short rounded ones, with a longer and more slender one between them, located on the anal tube near its ventral surface. They are sometimes covered over and obscured by the cirri of the last setigerous somites.

Cirrus-like gills occur in each setigerous somite except the 1st. They are long and slender and extend approximately to the mid-dorsal line. Laterally, pigment spots first appear posterior to the 5th seta tuft on either side and are continued posteriorly for at least 21 somites. The first two pairs are very small, the next nine pairs are much larger and the remaining pairs are small again. Associated with each of the two posterior pairs of these pigment spots is a much larger spot, located ventrally and more deeply imbedded in the body tissue so that it is seen only obscurely from the surface.

The pharynx is only partially protruded in any specimen but apparently is cylindrical. On either side of its base is a tuft of papillae which would locate this species in Kinberg's genus *Terpsicore* (1865, p. 257), but it lacks the anal cirri given by Kinberg as diagnostic of that species.

The parapodia (Fig. 26) are very small, the neuropodium having a prominent rounded end, and the seta tuft arises posterior to that. The notopodium has several rounded lobes and the dorsal seta tuft arises between its base and that of the gill. The gills are very large relative to the parapodium (Fig. 26). The ventral setae are much shorter than the dorsal and are fewer in number, all being unilimbate, curving gently to an acute apex. The dorsal setae are of varying lengths, some being nearly as long as the gill, others much shorter, but in general are much longer than the ventral ones. All are very narrowly limbate. The central axis is markedly striated.

The type was collected in sand near Nonsuch Island, 10 feet deep, June 25, 1929 (No. 29,470). Others were taken in sand, 35 feet deep, near Gurnet's Rock, April 6, 1929 (No. 29,473), and in sand near Nonsuch Island, 10 feet deep, Oct. 1, 1931 (No. 312,233). A considerable number are recorded simply as from Castle Harbor in sand in association with *Asymmetron*. There is a marked superficial resemblance between the annelid and the cephalochordate which has been commented upon by various writers.

Polyophthalmus Quatrefages.
Polyophthalmus incertus n. sp.
(Figs. 27-29).

In material collected under electric light at the wharf on Nonsuch Island on the evening of Aug. 18, 1931, was a single specimen of *Polyophthalmus* which is the type of this new species. On the following evening a large number of much smaller specimens of the same genus were collected at this locality. The type is 8 mm. long and while the ones collected later may reach a length of 5 mm., they are so slender that they give the impression of being very much smaller. When alive in sea water their form

and movements give them very much the appearance of nematodes. The type is well preserved but for some reason the preservation methods which have given excellent results in other cases did not succeed with the others, the cuticle being much swollen and thrown into folds so that the animals look as if they are living in a definite "haus." The rarity of the genus makes it important that its occurrence should be recorded though the present scarcity of material prevents a thorough species diagnosis. Furthermore, since the species is not generally pelagic, it is probable that these are immature stages. The following description must therefore be regarded as tentative, to be corrected and expanded when better material is available.

The type is marked by 14 lateral "eye spots" of which the 1st is very small, the 2nd about twice as large as the 1st and the 3rd more than twice the size of the 2nd. The 4th to 9th inclusive are of the same size as the 3d, while the next 5 become successively smaller. In the anterior part of the body pigment patches occur in a scattered arrangement over the dorsal surface but in about the region of the 1st lateral eye spot these are more definitely localized in the mid-dorsal line and throughout the greater part of the body they occur as transverse brown patches in the mid-dorsal surface, presumably arranged somitically, though the somite limits are not easy to determine. At the posterior end the body narrows into a tubular pygidial region (Fig. 29) which carries a row of about twenty cirri around its posterior margin. This pygidial region is marked on either side by a series of 7 pigmented rings.

The prostomium (Fig. 27) is broadly rounded and carries one pair of prominent brown eyes. Behind the eyes is a transverse suture, presumably indicating a nuchal organ. The mouth (Fig. 28) is an elongated slit, having fleshy lateral lips.

Throughout most of the body the setae are very small and few in number so that they are difficult to see, but at the posterior end, where the body is beginning to narrow into the pygidial region, 4 somites carry each a dorsal and a ventral tuft of very long setae, longer than the transverse diameter of the body at this point. The setae are very slender and sharp pointed.

In its body pigmentation this species apparently resembles *P. pictus* Dujardin, but differs decidedly from that in the form of the head and tail regions as figured by Fauvel (1914, pp. 247, 248, Pl. 22, Figs. 8, 9).

The type was collected at an undersea lamp, Nonsuch Island, Aug. 18, 1931 (No. 311,437) and is in the collections of the Department of Tropical Research of the New York Zoological Society. There is another specimen from the same locality, Aug. 19, 1931 (No. 311,487).

Family Typhloscolecidae.
Travisiopsis Levinsen.
Travisiopsis atlantica n. sp.
(Figs. 30-33).

The type is 24 mm. long and has a body width of 4 mm. Thirty somites carry the flattened cirri. The prostomium (Fig. 30) is bluntly conical but has a short filamentous tip and its basal diameter is about equal to its length. It is largely covered on either side by the overlapping 1st cirrus. On the posterior border of the 1st somite is a pair of tentacular processes which are about as long as the 2nd somite and in the preserved material extend almost vertically. The mouth is a relatively large circular opening.

The first 3 pairs of cirri are notopodial but beginning with the 4th they occur on both noto- and neuropodia and this arrangement is continued throughout the body. The first pair are nearly circular in outline but later

ones become broadly ovate with flattened points of attachment and narrow points on the outer margins (Fig. 31). A ring of 5 narrower cirri surround the anal opening. These (Fig. 32) are carried on a prominent cirrophore and are asymmetrically lanceolate in outline but have blunt apices. From the base to the apex and nearer one margin is a band of much firmer texture than elsewhere in the cirrus and must give it a considerable degree of rigidity. A much smaller band occurs in the other cirri. When in position, because they extend stiffly out from the posterior end while the other cirri are apt to lie more closely appressed against the sides of the body, the anal cirri appear to be much larger than the others. Figs. 31 and 32, drawn to the same scale, show this to be erroneous. The cirrus from which Fig. 32 was drawn was cut from the type which was the only one in which these anal cirri were not badly wrinkled. The setae in the smaller specimens are more easily seen than in the larger. They are few in number in a single tuft, stout and sharp pointed (Fig. 33).

The type was collected in Net 1,151, 600 fathoms, Aug. 8, 1931 (No. 311,116), and is in the collections of the Department of Tropical Research of the New York Zoological Society. Others were taken in the following nets: Net 798, 600 fathoms, July 15, 1930 (No. 30,522); Net 860, 600 fathoms, Sept. 8, 1930 (No. 30,793); Net 866, 700 fathoms, Sept. 10, 1930 (No. 30,830), and Net 929, 700 fathoms, Sept. 20, 1930 (No. 301,134).

Travisiopsis sp. ?

These are smaller than *T. atlantica* and their systematic position is doubtful, though they may be the young of that species. Only a few cirri are preserved. The setae are similar to those of *T. atlantica* but especially in the posterior portion of the body are more prominent and extend to a considerable distance from the body wall.

Collected in Net 693, 900 fathoms, June 12, 1930 (No. 30,182); Net 726, 800 fathoms, June 26 (No. 30,258); Net 893, 900 fathoms, June 15, 1930 (No. 301,058); Net 917, 600 fathoms, Sept. 19, 1930 (No. 30,964). Fragments too much injured for any identification were taken in two other nets (Nos. 30,964; 30,258).

Family Cirratulidae.

Cirratulus Lamarck.

Cirratulus multicirratus n. sp.

(Figs. 34, 35).

The type and only specimen is 60 mm. long and has a body width of 4 mm. in the widest portion. All except the first two somites are very short. Cirri begin on the 1st setigerous somite and continue nearly to the extreme posterior end. In the anterior region they occur on every somite but toward the posterior end there are considerable gaps in the series, though considering the fact that they may appear in several consecutive somites and then be lacking from another set, it is possible that their absence means a loss rather than a normal condition. The prostomium (Fig. 34) is bluntly conical and is so much fused with the 1st somite and this latter with the 2nd that it is difficult to distinguish the boundaries, except for faint lines on the lateral surfaces. The first two somites together are about as long as the prostomium, while the 3rd somite is hardly more than half as long as the second. Posteriorly there is an increase in somite length. The body narrows decidedly toward the posterior end and the pygidium is cylindrical with an oval, dorsally directed anus. Setae begin on the 3rd somite as capillary structures in both parapodial lobes. Hooks (Fig. 35) appear in the ventral ramus by the end of the anterior quarter of the body and pos-

terior to the middle of the body they are the only ones represented in the parapodia.

The first cirri are small but in the region from the 10th to the 20th somites they are much longer, forming a noticeable bunch. Later they again become smaller, but the length is always many times the body width. On either side of the dorsal surface of the 5th setigerous somite is a tuft of 6-8 gills smaller than the neighboring cirri. They are bunched close to the margins on either side, leaving the greater part of the dorsal surface uncovered.

The type was collected on mud flats on St. David's Island, Bermuda, Aug. 17, 1931 (No. 311,398) and is in the collections of the Department of Tropical Research of the New York Zoological Society.

Audouinea Quatrefages.
Audouinea pygidia n. sp.
(Figs. 22, 23)

Two specimens of which the larger is 22 mm. long and 2.5 mm. in greatest width. The most characteristic external feature is that the posterior end over a region of some twenty somites is entirely colorless, while immediately in front of this an area of about the same number of somites is colored black. If found in only one individual the colorless region might reasonably be regarded as a regenerating portion, but since it is present in both it is obviously a normal condition. The remainder of the body is light brown in color, with a tendency toward a darker tone anteriorly, but the extreme anterior end is lighter.

The prostomial width much exceeds its breadth and its margins merge into those of the 1st somite (Fig. 22), the two making an area whose basal width is about twice its length and except that the base is a trifle too wide, is hemispherical in outline. The second somite is shorter at the margins than on the dorsal surface where it expands to project posteriorly into the anterior margin of the 3rd somite. The 3rd somite is twice as long as the 2nd. Later somites are all very short as compared with their width, but behind the first eighth of the body this proportion slightly increases. Capillary setae first appear in the 4th somite and hooks occur in the neuropodia after about the 20th somite, while only capillary ones are found in the notopodia.

Apparently most of the dorsal cirri have been lost from both specimens since their distribution is different in the two, but occur in scattering fashion to the extreme posterior end. In the type there is a small one on the 3rd somite, a much larger one on the 6th and an irregular distribution farther back. A very large dorsal gill was located on the 5th somite in the type. This was broken away by an accident, but from the scars it seems certain that originally there were two of these on either side of the body, lying on the 5th and 6th somites.

The setae of anterior somites and of the notopodium in all somites are capillary, numerous in each tuft, long, slender and sharp pointed. The hooks are dark brown in color, curved to an acute point at the end and protrude for a considerable distance from the body surface (Fig. 23).

The paratypes were collected from tidepools on Nonsuch Island, Sept. 12, 1930 (No. 301,675), and are in the collections of the Department of Tropical Research of the New York Zoological Society.

Dodecaceria Oersted.
Dodecaceria sp. ?

Fragments too poorly preserved for identification, collected in tidepools, Nonsuch Island, April 23, 1929 (No. 2,945) and Aug. 16, 1931 (No. 311,357).

Family Sabellidae.

Protulides Webster.

Protulides elegans Webster.

Protulides elegans Webster, 1884, pp. 325, 326; Pl. 10, Figs. 63-74.

Collected from reef, Castle Harbor, Aug. 15, 1931 (No. 311,335). One specimen.

Vermilia Lamarck.

Vermilia glandulata n. sp.

(Figs. 36-39).

The type has a total length of 13 mm. of which the thorax and branchiae each make up 3 mm. The opercular stalk is as long as the branchiae and carries a large globular operculum. There are 13 branchiae on the right and 12 plus the opercular stalk on the left. The opercular stalk (Fig. 36) is divided into about twenty rings of which the terminal is the largest. The operculum is a globular body which on its outer surface is drawn out into a terminal portion which was covered by a white limestone deposit. This terminal portion is brown in color and marked by circular brown lines darker than the general surface. The remainder of the body is colorless. The gill filaments are in two rows and are very short, hardly longer than the diameter of the main branchial stem.

There are 7 somites in the thorax. The collar is in the form of a broad wing on either side and on its anterior margin its breadth is equal to the body width. Its lateral margins slope to meet the body wall at the level of the 5th setigerous somite. The dorsal collar lobe is distinct from the lateral ones and extends anteriorly to cover the bases of the branchiae.

The abdominal somites are very short and a noticeable feature is that on the ventral surfaces of the posterior twenty are ventral shields which are more prominent in one of the two specimens than in the other.

Setae of the simple type occur in the 1st setigerous somite and are of two forms. The first (Fig. 37) are very slender, long and sharp pointed; the second (Fig. 38) are fully four times as broad as the first and are marked by fine diagonal striations. Similar setae are found in the other somites throughout the body, but in the abdomen they are very short and do not protrude far from the body surface. At the extreme posterior end is a series of setae like those of Fig. 37 in general outline, but very long. The uncini of thorax and of abdomen are alike, each (Fig. 39) having a basal knob and 20 fine teeth.

In its annulated opercular stalk this species resembles Schmarda's *V. annulata* described originally from Jamaica, but the description revised and enlarged by Ehlers (1887, p. 308, Pl. 58, Figs. 12-16; Pl. 59, Figs. 1-3), but they differ in the form of the operculum, in the number of the branchiae and in the shape of the uncini.

The tube has the form characteristic of this genus, a heavy shell marked by longitudinal lines.

The type was collected at Gurnet's Rock, 35 feet deep, Aug. 19, 1931 (No. 311,480), and is in the collections of the Department of Tropical Research of the New York Zoological Society. Another specimen was taken at Castle Harbor, reef, Aug. 16, 1931 (No. 311,347).

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EXPLANATION OF THE PLATES.

Plate I.

Eunoe purpurea

Fig. 1. Head x 7.
Fig. 2. Sixteenth parapodium x 14.
Fig. 3. Ventral seta x 65.
Fig. 4. Ventral seta x 65.
Fig. 5. Large dorsal seta x 85.
Fig. 6. Elytron x 10.

Drieschia atlantica

Fig. 7 Head x 10.
Fig. 8. Parapodium x 45.
Fig. 9. Ventral seta x 185.

Eupholoë nuda

Fig. 10. Head x 16.
Fig. 11. Parapodium x 45.
Fig. 12. Notopodial seta x 185.
Fig. 13. Neuropodial seta x 185.
Fig. 14. Second form of neuropodial seta x 185.

Plate II.

Nereis bairdii

Fig. 15. Parapodium of heteronereis phase x 45.

Nereis glandulata

Fig. 16. Parapodium from anterior portion of body in heteronereis phase.
Fig. 17. Parapodium from posterior portion in heteronereis phase.

Tomopteris longisetis

Fig. 18. Ventral view of head x 5.
Fig. 19. Parapodium x 5.
Fig. 20. Uncolored rosette x 45.
Fig. 21. Colored rosette x 68.

Audouinea pygidia

Fig. 22. Head x 10.
Fig. 23. Seta x 185.

Ammotrypane bermudiensis

Fig. 24. Anterior end x 5.
Fig. 25. Anal tube x 6.
Fig. 26. Parapodium x 85.

Polyophthalmus incertus

Fig. 27. Dorsal view of head x 45.
Fig. 28. Ventral view of head x 45.
Fig. 29. Pygidium x 45.

Plate III.

Travisiopsis atlantica

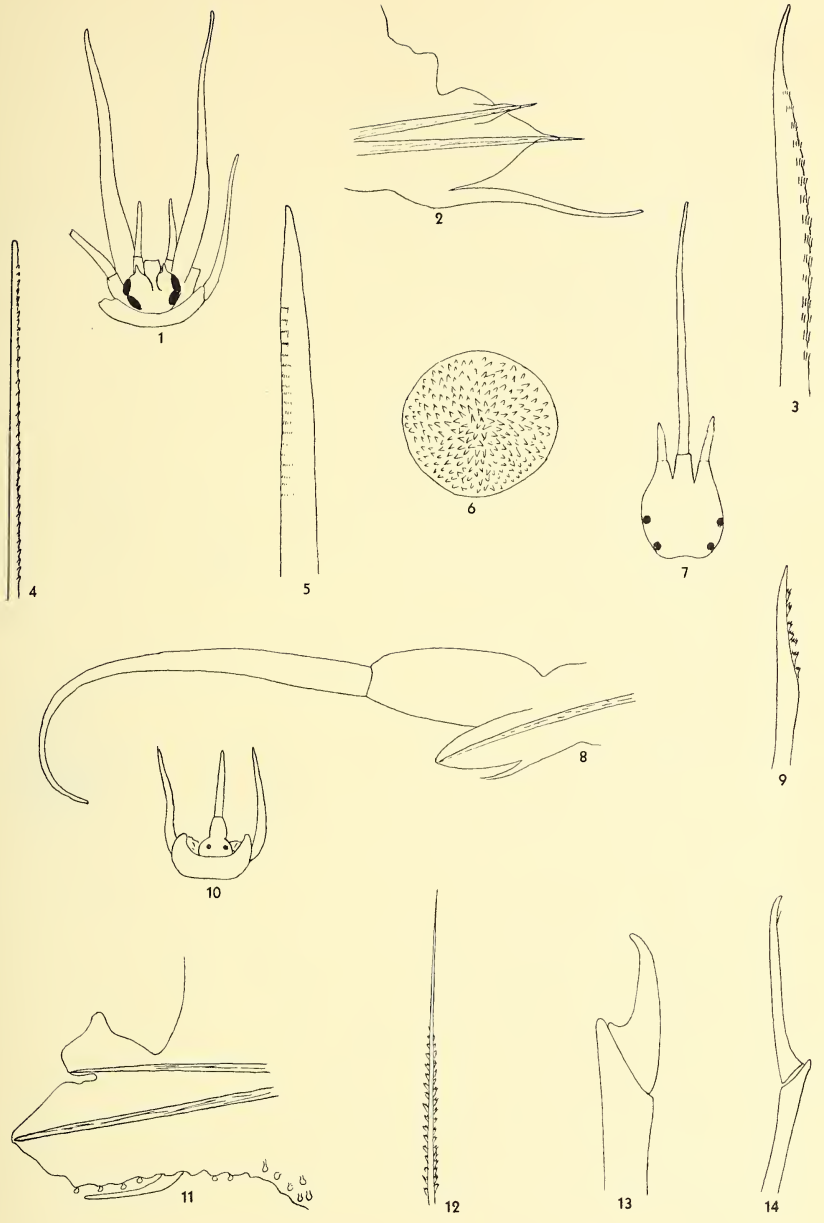
Fig. 30. Head x 23.
Fig. 31. Cirrus from body somite x 45.
Fig. 32. Anal cirrus x 45.
Fig. 33. Seta x 68.

Cirratulus multicirratus

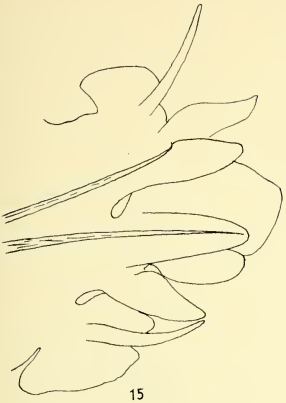
Fig. 34. Head x 10.
Fig. 35. Hook x 185.

Vermilia glandulata

Fig. 36. Operculum x 4.
Fig. 37. Slender seta x 185.
Fig. 38. Larger seta x 185.
Fig. 39. Uncinus x 250.



POLYCHAETOUS ANNELIDS FROM THE VICINITY OF NONSUCH ISLAND, BERMUDA.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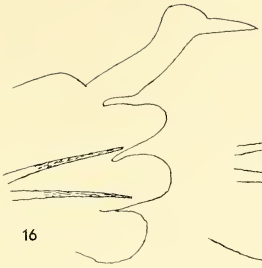
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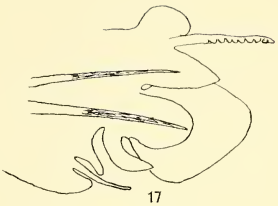
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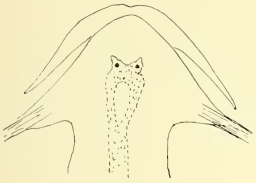
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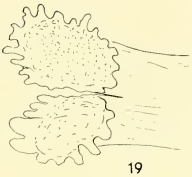
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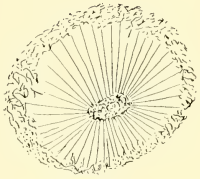
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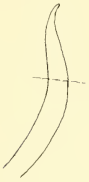
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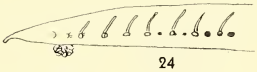
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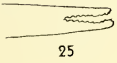
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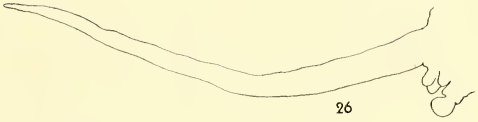
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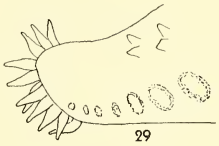
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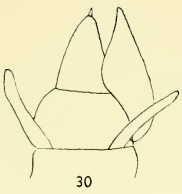
POLYCHAETOUS ANNELIDS FROM THE VICINITY OF NONSUCH ISLAND, BERMUDA.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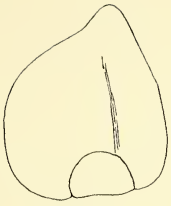
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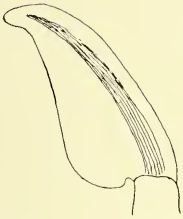
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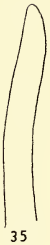
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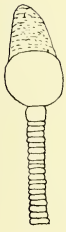
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POLYCHAETOUS ANNELIDS FROM THE VICINITY OF NONSUCH ISLAND, BERMUDA.

For the information of persons or institutions receiving Zoologica:

Beginning with Volume XXI, *Zoologica* will be published in four quarterly Parts. Title page, Contents and Index will be found in Part IV of each volume.

Beginning with Volume XXI, it will be assumed that each Part of *Zoologica* is actually delivered to the person or institution to which it is addressed. Consequently, no requests can be entertained for *gratis* copies to complete files in which Parts are declared to be missing. As long as Parts are in print, they will be supplied at the price fixed by the cost of printing.

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July 9, 1936

CONTENTS

3.

Bermuda Oceanographic Expeditions. Individual Nets and Data, 1932-1935[1].

WILLIAM BEEBE.

Director, Department of Tropical Research,
New York Zoological Society.

The absence of nets during 1932 was due to constant and intensive operation of the bathysphere dives.

The lists and data of preceding nets, from Nos. 1 to 1350, together with an account of previous oceanographic investigations near Bermuda, description of the collecting apparatus, methods of trawling, and details of the locality chosen for study, are to be found in ZOOLOGICA, Volume XIII, Numbers 1, 2 and 3.

All foot nets are diatom nets, of No. 20 standard bolting cloth. Other nets are standard Michel Sars patterns, of 2XX bolting cloth.

Nets marked with an asterisk (*) were drawn in Castle Harbor, inside of the outer reefs. All others were drawn out at sea.

INDIVIDUAL NETS AND DATA

Net No.	Type of Net	Depth		Date 1933	Start of Haul	Duration of Haul		Direction of Haul	Weather	Wind		Sea
		Fathoms	Metres			Hrs.	Mins.			Direction	Force	
				Sept.								
1351	Metre	0	0	4	8:05 p.m.	—	20	E	No moon	0	0	Calm
*1352	Foot	0	0	14	7:45	—	45	E	No moon	0	0	Calm
*1353	Foot	0	0	15	7:45	—	50	E	No moon	SE	4	Calm
*1354	Foot	0	0	17	10:00 a.m.	1	0	E	Overcast	SW	5	Choppy
*1355	Foot	0	0	17	7:35 p.m.	1	0	E	No moon	WSW	5	Choppy
*1356	Foot	0	0	17	7:35	1	0	E	No moon	WSW	5	Choppy
*1357	½-Metre	0	0	18	8:00	—	50	W	No moon	SW	3	Choppy
*1358	Foot	0	0	18	8:00	—	50	W	No moon	SW	3	Choppy
*1359	Foot	0	0	18	8:00	—	50	E	No moon	SW	3	Choppy
*1360	Foot	0	0	19	8:00	1	0	E	No moon	SW	5	Choppy
*1361	Foot	0	0	19	8:00	1	0	E	No moon	SW	5	Choppy
*1362	½-Metre	0	0	19	8:00	1	0	E	No moon	SW	5	Choppy
1363	Metre	0	0	20	8:00	1	0	N	No moon	SW	2	Choppy
1364	Foot	0	0	20	8:00	1	0	N	No moon	SW	2	Choppy
*1365	½-Metre	0	0	22	8:00	1	0	E	No moon	WSW	4	Choppy
*1366	Foot	0	0	22	8:00	1	0	E	No moon	WSW	4	Choppy
*1367	Foot	0	0	22	8:00	1	0	E	No moon	WSW	4	Choppy

[1] Contribution No. 494, Department of Tropical Research, New York Zoological Society.

INDIVIDUAL NETS AND DATA (*continued*)

Net No.	Type of Net	Depth		Date 1933	Start of Haul	Duration of Haul		Direction of Haul	Weather	Wind		Sea
		Fathoms	Metres			Hrs.	Mins.			Direction	Force	
				Sept.								
*1368	Foot	0	0	23	8:00	—	30	W	No moon	0	0	Calm
*1369	Foot	0	0	23	8:00	—	30	W	No moon	0	0	Calm
1370	½-Metre	0	0	24	5:00 a.m.	—	30	E	No moon	0	0	Calm
1371	Metre	0	0	24	5:00	1	0	E	No moon	0	0	Calm
1372	½-Metre	0	0	25	5:30	—	30	E	Clear	NE	1	Calm
1373	½-Metre	0	0	25	6:00	—	30	E	Clear	NE	1	Calm
1374	Metre	0	0	25	5:30	—	30	E	Clear	NE	1	Calm
1375	Metre	0	0	25	6:00	—	30	E	Clear	NE	1	Calm
*1376	Foot	0	0	26	7:50	—	35	W	Moonlight	0	0	Calm
*1377	Foot	0	0	26	7:50	—	35	W	Moonlight	0	0	Calm
1378	Metre	0	0	27	4:45	—	20	E	No moon	0	0	Calm
1379	Metre	0	0	27	5:05	—	20	E	No moon	0	0	Calm
1380	Metre	0	0	27	5:25	—	20	E	No moon	0	0	Calm
1381	Metre	0	0	27	5:45	—	20	E	Clear	0	0	Calm
1382	½-Metre	0	0	27	4:45	—	20	E	No moon	0	0	Calm
1383	½-Metre	0	0	27	5:05	—	20	E	No moon	0	0	Calm
*1384	Foot	1	2	27	3:00 p.m.	—	15	W	Clear	0	0	Calm
1385	Metre	0	0	28	4:30 a.m.	—	20	E	No moon	ESE	3	Choppy
1386	Metre	0	0	28	4:50	—	20	E	No moon	ESE	3	Choppy
1387	Metre	0	0	28	5:10	—	25	E	No moon	ESE	3	Choppy
1388	Metre	0	0	28	5:35	—	25	W	Clear	ESE	3	Choppy
1389	½-Metre	0	0	28	4:30	—	20	E	No moon	ESE	3	Choppy
1390	½-Metre	0	0	28	4:50	—	20	E	No moon	ESE	3	Choppy
				Oct.								
*1391	Foot	1	2	2	3:30 p.m.	—	30	W	Clear	SE	3	Choppy
1392	Foot	0	0	4	7:25	—	20	N	Moonlight	SE	4	Choppy
1393	Foot	0	0	4	7:45	—	15	N	Moonlight	SE	4	Choppy
1394	Foot	0	0	4	8:00	—	25	S	Moonlight	SE	4	Choppy
1395	Foot	0	0	4	8:00	—	25	S	Moonlight	SE	4	Choppy
*1396	Foot	0	0	7	7:30	—	45	W	No moon	SW	4	Choppy
*1397	Foot	0	0	7	7:30	—	45	W	No moon	SW	4	Choppy
1398	Metre	0	0	9	7:45	—	20	E	No moon	NE	3	Choppy
1399	Metre	0	0	9	8:00	—	20	W	No moon	NE	3	Choppy
1400	Foot	0	0	9	7:45	—	20	E	No moon	NE	3	Choppy
1401	Foot	0	0	9	8:10	—	20	W	No moon	NE	3	Choppy
1402	Metre	0	0	10	8:20	—	20	NxE	No moon	0	0	Calm
1403	Metre	0	0	10	8:40	—	20	NxE	No moon	0	0	Calm
1404	Metre	0	0	10	9:00	—	20	NxE	No moon	0	0	Calm
1405	½-Metre	0	0	10	8:20	—	20	NxE	No moon	0	0	Calm
1406	½-Metre	0	0	10	8:40	—	20	NxE	No moon	0	0	Calm
1407	½-Metre	0	0	10	9:00	—	20	NxE	No moon	0	0	Calm
1408	Metre	0	0	11	7:45	—	20	ExN	No moon	SE	3	Choppy
1409	Metre	0	0	11	8:05	—	20	ExN	No moon	SE	3	Choppy
1410	Metre	0	0	11	8:25	—	20	WxS	No moon	SE	3	Choppy
1411	½-Metre	0	0	11	7:45	—	20	ExN	No moon	SE	3	Choppy
1412	½-Metre	0	0	11	8:05	—	20	ExN	No moon	SE	3	Choppy
1413	Metre	0	0	12	8:15	—	20	E	No moon	SE	3	Choppy
1414	Metre	0	0	12	8:35	—	20	E	No moon	SE	3	Choppy
1415	Metre	0	0	12	8:55	—	20	W	No moon	SE	3	Choppy
1416	½-Metre	0	0	12	8:15	—	20	E	No moon	SE	3	Choppy
1417	½-Metre	0	0	12	8:35	—	20	E	No moon	SE	3	Choppy
1418	Metre	0	0	14	7:40	—	20	E	No moon	NExN	2	Calm
1419	Metre	0	0	14	8:03	—	20	E	No moon	NExN	2	Calm
1420	Metre	0	0	14	8:25	—	20	W	No moon	NExN	2	Calm
1421	½-Metre	0	0	14	7:40	—	20	E	No moon	NExN	2	Calm
1422	½-Metre	0	0	14	8:03	—	20	E	No moon	NExN	2	Calm
1423	½-Metre	0	0	14	8:25	—	20	W	No moon	NExN	2	Calm
1424	Metre	0	0	18	7:40	—	20	ExN	No moon	NE	1	Calm

INDIVIDUAL NETS AND DATA (*continued*)

Net No.	Type of Net	Depth		Date 1933	Start of Haul	Duration of Haul		Direction of Haul	Weather	Wind		Sea
		Fathoms	Metres			Hrs.	Mins.			Direction	Force	
				Oct.								
1425	½-Metre	0	0	18	7:40	—	20	ExN	No moon	NE	1	Calm
1426	Metre	0	0	18	8:05	—	20	WxS	No moon	NE	1	Calm
1427	½-Metre	0	0	18	8:05	—	20	WxS	No moon	NE	1	Calm
1428	Metre	0	0	18	8:30	—	20	WxS	No moon	NE	1	Calm
1429	½-Metre	0	0	18	8:30	—	20	WxS	No moon	NE	1	Calm
*1430	Metre	0	0	20	2:15	—	20	S	Clear	ExN	4	Choppy
*1431	Foot	0	0	20	2:15	—	20	S	Clear	ExN	4	Choppy
*1432	Metre	0	0	20	2:40	—	20	S	Clear	ExN	4	Choppy
*1433	Foot	0	0	20	2:40	—	20	S	Clear	ExN	4	Choppy
*1434	Metre	0	0	20	3:15	—	15	N	Clear	ExN	4	Choppy
*1435	Foot	0	0	20	3:15	—	15	N	Clear	ExN	4	Choppy
*1436	Foot	0	0	21	7:15	—	20	W	Overcast	ESE	5	Choppy
*1437	½-Metre	0	0	25	7:15	—	30	W	Moonlight	SW	2	Calm
*1438	½-Metre	0	0	27	8:00	—	30	W	Overcast	ESE	5	Choppy
1439	Metre	0	0	28	2:15	—	20	E	Clear	SW	4	Choppy
1440	Foot	0	0	28	2:15	—	20	E	Clear	SW	4	Choppy
1441	Metre	0	0	28	2:40	—	20	W	Clear	SW	4	Choppy
1442	Foot	1½	2¼	28	2:40	—	20	W	Clear	SW	4	Choppy
1443	Metre	0	0	28	3:15	—	15	W	Clear	SW	4	Choppy
1444	Foot	1½	2¼	28	3:15	—	15	W	Clear	SW	4	Choppy
				Nov.								
*1445	Foot	0	0	1	7:30	—	30	W	Moonlight	0	0	Calm
1446	Metre	0	0	2	4:45 a.m.	—	20	E	Moonlight	NNE	4	Choppy
1447	Foot	0	0	2	4:45	—	20	E	Moonlight	NNE	4	Choppy
1448	Metre	0	0	2	5:10	—	20	E	Moonlight	NNE	4	Choppy
1449	½-Metre	0	0	2	5:10	—	20	E	Moonlight	NNE	4	Choppy
1450	Metre	0	0	2	5:40	—	20	W	Overcast	NNE	4	Choppy
1451	½-Metre	0	0	2	5:40	—	20	W	Overcast	NNE	4	Choppy
1452	Metre	0	0	11	2:45 p.m.	—	20	E	Overcast	ENE	5	Rough
1453	Metre	0	0	11	3:10	—	20	E	Overcast	ENE	5	Rough
1454	Metre	0	0	11	3:35	—	20	S	Overcast	ENE	5	Rough
1455	½-Metre	1	2	11	2:45	—	20	E	Overcast	ENE	5	Rough
1456	Foot	1	2	11	3:10	—	20	E	Overcast	ENE	5	Rough
1457	½-Metre	1	2	11	3:35	—	20	S	Overcast	ENE	5	Rough
1458	Metre	0	0	21	7:45	—	25	E	Moonlight	0	0	Calm
1459	Metre	0	0	21	8:15	—	25	E	Moonlight	0	0	Calm
1460	Foot D.	0	0	21	7:45	—	25	E	Moonlight	0	0	Calm
1461	½-Metre	0	0	21	8:15	—	25	E	Moonlight	0	0	Calm
				1934								
				May								
*1462	½-Metre	0	0	18	8:10 p.m.	—	20	E	Overcast	SE	5	Choppy
*1463	½-Metre	0	0	20	9:10 a.m.	—	20	E	Clear	0	0	Calm
*1464	½-Metre	0	0	20	9:35	—	20	E	Clear	0	0	Calm
1465	½-Metre	0	0	21	11:45	—	15	S	Clear	0	0	Calm
1466	½-Metre	0	0	22	3:30 p.m.	—	10	S	Clear	—	—	Rough
*1467	½-Metre	0	0	26	9:15 a.m.	—	15	S	Clear	S	3	Choppy
1468	½-Metre	0	0	26	9:35	—	20	S	Clear	S	3	Choppy
*1469	½-Metre	0	0	31	8:50	—	20	S	Overcast	SW	3	Choppy
*1470	½-Metre	½	¼	31	9:20	—	20	S	Overcast	SW	3	Choppy
*1471	Foot	1	2	31	8:50	—	20	S	Overcast	SW	3	Choppy
*1472	Foot	0	0	31	9:20	—	20	S	Overcast	SW	3	Choppy
				June								
1473	½-Metre	0	0	1	3:25 p.m.	—	20	E	Overcast	WxN	3	Swell
1474	½-Metre	1	2	1	3:50	—	20	W	Overcast	WxN	3	Swell
1475	Foot	1	2	1	3:25	—	20	E	Overcast	WxN	3	Swell
1476	Foot	0	0	1	3:50	—	20	W	Overcast	WxN	3	Swell
*1477	½-Metre	0	0	8	10:30 a.m.	—	40	S	Clear	SW	2	Choppy

INDIVIDUAL NETS AND DATA (*continued*)

Net No.	Type of Net	Depth		Date 1934	Start of Haul	Duration of Haul		Direction of Haul	Weather	Wind		Sea
		Fathoms	Metres			Hrs.	Mins.			Direction	Force	
				July								
1478	Foot	0	0	2	3:00 p.m.	—	40	E	Clear	SW	4	Choppy
1479	½-Metre	0	0	2	3:00	—	40	E	Clear	SW	4	Choppy
1480	½-Metre	0	0	4	11:00 a.m.	—	20	S	Clear	0	0	Choppy
1481	½-Metre	0	0	12	3:00 p.m.	—	40	S	Clear	SW	3	Choppy
1482	Foot	0	0	12	3:00	—	40	S	Clear	SW	3	Choppy
				Aug.								
1483	Metre	0	0	20	10:30 a.m.	—	30	NW	Clear	0	0	Calm
				Sept.								
1484	Metre	0	0	7	9:30	—	20	E	Clear	0	0	Calm
1485	Metre	0	0	7	9:52	—	10	E	Clear	0	0	Calm
1486	Metre	0	0	9	2:40 p.m.	—	20	E	Clear	0	0	Calm
1487	Metre	0	0	9	3:01	—	15	E	Clear	0	0	Calm
1488	Metre	0	0	16	3:00	—	20	E	Clear	0	0	Calm
1489	Metre	0	0	17	2:20	—	20	E	Clear	0	0	Calm
1490	Metre	0	0	18	3:20	—	20	E	Clear	0	0	Calm
1491	Metre	0	0	18	3:44	—	20	E	Clear	0	0	Calm
1492	Metre	0	0	26	3:20	—	20	E	Clear	0	0	Calm
1493	Metre	0	0	26	3:40	—	20	E	Clear	0	0	Calm
1494	Metre	0	0	28	2:40	—	20	SE	Clear	ESE	5	Rough
				Oct.								
*1495	Metre	½	¼	6	3:15	—	15	E	Overcast	—	4	Choppy
1496	Metre	0	0	9	2:45	—	20	SE	Clear	NE	3	Rough
1497	Metre	0	0	9	3:10	—	15	NW	Clear	NE	3	Rough
*1498	½-Metre	0	0	9	8:00	—	20	E	No moon	NE	3	Choppy
1499	Metre	0	0	13	3:30	—	15	E	Clear	SW	3	Rough
1500	Metre	0	0	14	3:25	—	20	E	Overcast	NE	3	Choppy
				July								
1501	Metre	400	732	25	9:40 a.m.	4	03	SSE	Clear	NNE	4	Choppy
1502	Metre	500	914	25	9:40	4	03	SSE	Clear	NNE	4	Choppy
1503	Metre	600	1097	25	9:40	4	03	SSE	Clear	NNE	4	Choppy
1504	Metre	700	1280	25	9:40	4	03	SSE	Clear	NNE	4	Choppy
1505	Metre	800	1463	25	9:40	4	03	SSE	Clear	NNE	4	Choppy
1506	Metre	900	1646	25	9:40	4	03	SSE	Clear	NNE	4	Choppy
				Aug.								
1507	Metre	50	92	14	12:16 p.m.	2	30	SSE	Clear	SW	2	Calm
1508	Metre	100	183	14	12:16	2	30	SSE	Clear	SW	2	Calm
1509	Metre	200	366	14	12:16	2	30	SSE	Clear	SW	2	Calm
1510	Metre	300	549	14	12:16	2	30	SSE	Clear	SW	2	Calm
1511	Metre	400	732	14	12:16	2	30	SSE	Clear	SW	2	Calm
1512	Metre	500	914	14	12:16	2	30	SSE	Clear	SW	2	Calm
1513	Tangle	1350	2470	14	9:30 a.m.	—	36	SSE	Clear	SW	2	Calm
				Oct.								
1514	Metre	0	0	15	4:00 p.m.	—	20	E	Clear	0	0	Calm
1515	Metre	0	0	15	3:35	—	20	E	Clear	0	0	Calm
1516	Metre	0	0	16	3:30	—	20	E	Overcast	0	0	Calm
1517	Metre	0	0	17	4:00	—	30	E	Overcast	NE	3	Rough
				1935								
				June								
1518	Metre	0	0	7	9:30 a.m.	—	44	E	Overcast	E	3	Choppy
1519	Metre	0	0	12	9:40	—	20	S	Clear	SW	3	Swell
1520	Metre	0	0	15	9:10	—	30	E	Clear	S	2	Choppy
1521	Metre	0	0	15	9:50	—	10	W	Clear	S	2	Choppy
*1522	Metre	0	0	19	2:40 p.m.	—	20	W	Clear	SW	3	Choppy
1523	Metre	0	0	24	2:20	—	50	E	Clear	SSE	3	Choppy
1524	Metre	0	0	29	9:40 a.m.	—	35	E	Clear	E	3	Swell
				July								
1525	Metre	0	0	3	9:10	—	40	E	Overcast	SE	3	Rough